# CHEMISTRY.

## No. I.

## PREPARATION OF PHOTOGENIC PAPER.

*The* SILVER MEDAL *was presented to Mr. J. T.* COOPER, *of the Polytechnic Institution, Regent Street, for his Method of preparing Paper for Photographic Drawings, from whom the following Communication has been received.*

THE recent experiments of Mr. Talbot have proved that the discovery made long since by Scheele, of the fact that chloride of silver becomes discoloured by exposure to light, is capable of successful application in the arts.

The object, however, of this communication is not to point out the numerous purposes for which the photogenic paper is applicable, but to describe, as briefly as possible, the method I have found to answer best for making it on a large scale, uniting the three important requisites of economy, sensibility, and uniformity of surface.

Having made trial of between forty and fifty different varieties of paper, obtained from various manufacturers, that which I have found to answer the best, and therefore always use, is a fine quality of demy, 16 lbs. to the ream. The sheets are cut into two parts, lengthways, and placed in a liquid made by dissolving 1 lb. of dry common table-salt in 25 pints of clean water, and are

allowed to remain in it for 30 hours. They are then lifted out by means of a tray of basket-work, previously placed beneath them, and hung upon lines to dry.

They are now ready to receive the preparation of silver, which should be a perfectly neutral solution of the nitrate of that metal, of sp. gr. 1·066, which may be readily obtained by dissolving 8000 grs. of fused nitrate of silver in 10 pints of distilled water, and filtering the solution.

I make use of a dish, or trough, a little wider than the paper; and a half-sheet, thoroughly dry, is held by the hand at each end, while an assistant places upon it two glass-rods, these rods being handled by two other glass-rods turned up at the end.

The paper and rods being then immersed in the trough, it is drawn quickly backwards and forwards through the solution, care being taken not to wet the fingers; this being effected by not immersing the whole of the sheet, but leaving about an inch and a half at each end, which is afterwards cut off and rejected.

By this means the solution is spread uniformly over the paper, the object of the glass-rods being, by their rolling over the surface of the paper, to remove the air-bubbles that adhere to it, without the least risk of disturbing or washing up the chloride of silver precipitated on its surface. These sheets are then hung upon lines to dry in a dark room, at the temperature of 75°.

The lines being arranged parallel with each other, at a distance of four inches, underneath them is placed a large shallow trough, constructed of varnished wood. This being slightly inclined, the liquid drains from it, and is caught by a filter, by which any chloride of silver it might contain is separated. I am in the habit of

floating a hydrometer in this liquid, and compensating for the loss of silver it sustains by the addition of a small quantity of a saturated solution, and it may then be used over again. It appears from my experiments, and from a chemical examination of the paper prepared in this way, that a mixture, in proper proportions, of the chloride and nitrate of silver, is far more rapidly acted upon by light than either of these compounds taken separately.

*Method of Fixing the Drawings.*

The only method of rendering the photogenic drawings permanent, is, I am convinced, by removing the whole of the silver (with the exception of the oxide that forms the picture) from the paper. This is effected by what Sir John Herschel proposed for the purpose, viz. a solution of the hyposulphite of soda.

I first steep the drawing for two or three minutes in water, to dissolve the undecomposed nitrate of silver, and then place it in a solution of hyposulphite of soda, sp. gr. 1·057, in which it should remain two or three minutes; then transferring it into a basin of clean water, and allowing it to soak for fifteen minutes, it may be dried, and will bear exposure to the sun without becoming at all discoloured.

I find that the iodide of potassium, although it fixes the drawings in such a manner as will enable them to bear exposure to light, is not to be relied upon, as sulphuretted hydrogen has the power of decomposing the iodide of silver, converting it into the black sulphuret.

Indeed the test that I am in the habit of using to ascertain whether a photogenic drawing is permanent or not, is to immerse a part of it in a dilute solution of hydrosulphate of ammonia. If the white parts of the

paper suffer no change, I am not then afraid of exposing it to the sun for any length of time whatever.

In conclusion, I beg to state that I shall be happy to wait on the Committee, and give any additional information that may be required respecting the detail of the process.

J. J. COOPER,
Resident Chemist Polytechnic Institution.

*May 19th*, 1839.

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## No. II.

## NEW TEST LIQUOR FOR ACIDS AND ALKALIES.

*The Thanks of the Society were voted to Mr. J. MARSH, of the Royal Arsenal, Woolwich, for his Test Liquor for Acids and Alkalies, prepared from the Petals of the Red Dahlia.*

THE infusion of the common red cabbage has been long in use in the chemical laboratory, as a test to distinguish acid from alkaline bodies when in solution; and, although possessed of great delicacy in this respect, is still subject to an objection, on account of its becoming so exceedingly offensive in its smell, after having been prepared a few months.

In order to obviate this objection, I undertook some experiments, about two years ago, on the colouring